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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/807,472	NAKAMURA, OSAMU	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 2, 3, 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention as explained hereunder.

Claims 2, 3, 24 recite "wherein the plasma generation unit is arranged linearly in one line or a plurality of lines, which is indefinite, since this limitation would be relevant only for plasma generating unit with electrodes disposed in plurality of opposed rows. However, line 2 of the claims recites "a plasma generation unit (s) comprising a first electrode and a plurality of second electrodes opposed to first electrode" implying that linear arrangement can only pertain to plurality of second electrodes not to plasma generation unit. Therefore for the purpose of examination on merits, the limitation has been interpreted as "whereas the plurality of second electrodes of the plasma generation unit are arranged linearly".

Response to Arguments

Applicant's arguments with respect to claim 1-30 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended claims 1-3, 24 by adding new limitations (for example in claim 1 – "blowing") and also added new claims 31-37.

Response to applicant's arguments is given hereunder.

Regarding Claims 1-3 and 24 - applicant argues that Gianchandani et al or Morfill et al do not teach blowing a process gas into a space between the first and plurality of second electrodes.

Examiner responds that Gianchandani et al teach gas from gas source 13 is introduced (blown) between substrate 17 (like first electrode) and second electrodes 51, 52 and wherein plasma is generated. Further, Gianchandani et al also teach plasma is generated within openings 24 in dielectric plate 24 (by dissociation of gas blown therein between substrate 17 (first electrode) and second electrode 26. Thus

Gianchandani et al teach blowing a process gas into a space between the first and plurality of second electrodes as per claim limitations. In view of above, all the rejections by Gianchandani et al, and Gianchandani et al in view of Morfill et al are maintained as explained below. Further, new claims 31-37 are also rejected as explained below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7, 10, 13, 16, 19 and 31-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870).

Regarding Claims 1, 31: Gianchandani et al teach a plasma apparatus (Figures 1-3) comprising:

a plasma generation unit comprising a substrate 17 (as a first electrode) and electrode elements 51, 52 (plurality of second electrodes) opposed to the first electrode 17;

a gas supply unit 13 for blowing (introducing) a process gas into a space between the first electrode 17 and the plurality of second electrodes (through openings 24 in dielectric layer 22) {the plasma is generated in the openings 24 due to dissociation of gas blown in these openings, by the voltage applied from a power supply}; and

a power supply unit 31 for applying a voltage independently (selectively) to at least one electrode among the plurality of second electrodes 51 and 52, wherein

the plurality of second electrodes of the plasma generation unit are arranged linearly in one line (column 2, lines 40-65 and column 5, line 25 to column 7, line 35).

Regarding Claims 7, 32: Gianchandani et al teach all limitation of the claim including that plurality of second electrodes 51, 52 (like plasma generation units) are arranged linearly and that voltage can be independently (selectively) applied to the various second electrodes 51, 52 (like plurality of plasma generators). Gianchandani et al also teach that electrode segments (plurality of second electrodes 51, 52) may be selectively moved with the help of holder 54 (Figure 3), around substrate area and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35).

Regarding Claims 10, 33: Gianchandani et al teach that plurality of second electrodes are formed using lithography techniques (Figure 5, column 10, lines 15-25).

Regarding Claims 13, 34: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Figure 1).

Regarding Claims 16, 35: Gianchandani et al teach the apparatus is used for etching or deposition (column 2, lines 50-60).

Regarding Claims 19, 36: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode (can be pre-determined electrode since voltage can be supplied independently to various electrodes) [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to

which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-6, 8, 9, 11, 12, 14, 15, 17, 18, 20-23 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870) in view of Morfill et al (US Patent No. 6,777,880).

Regarding Claims 2, 3: Gianchandani et al teach all limitations of the claim (as explained above under claim 1) and further teach plasma apparatus (Figures 1-3) comprising:

a plasma generation unit comprising a substrate 17 (first electrode) and a electrodes 51, 52 (plurality of second electrodes) opposed to the first electrode 17;

a gas supply unit 13 for introducing (blowing) a process gas into a space between the first electrode 26 and the plurality of second electrodes (openings 24 in dielectric layer 22) {the plasma is generated in the openings 24 due to dissociation of gas blown in between the electrodes 17 and 51, 52 by the voltage applied from a power supply}; and

a power supply 31 unit for selectively applying a voltage to at least one electrode among the plurality of second electrodes 51, 52,

the plurality of second electrodes of the plasma generation unit are arranged linearly in one line (column 2, lines 40-65 and column 5, line 25 to column 7, line 35).

Gianchandani et al further teach (Figure 8) that size and spacing of electrodes may be selected as per type of treatment required like anisotropic etch or isotropic etch etc (column 7, lines 15-30 and column 12, lines 5-30), but does not explicitly teach specific size of second electrode.

Morfill et al teach a plasma apparatus (Figures 1-6) comprising a segment electrode 11 with electrode segments 113 and a second electrode 112. Morfill et al further teach grid size of segmented electrode to be 1.27mm (as against claim size of 1 mm). Morfill et al also teach that size and spacing of electrode segments is application dependent (column 9, lines 10-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select size of second electrodes as taught by Morfill et al in the apparatus of Gianchandani et al as per type of process treatment required.

Regarding Claim 4: Gianchandani et al teach all limitations of the claim except pattern is a wiring pattern, which is an intended use. Since the prior art apparatus meets all structural limitations of the claim, the apparatus is considered capable of meeting this intended use limitation, absent any criticality disclosed.

Regarding Claims 5,6: Gianchandani et al teach a holder 54 that enables movement of second electrodes 51, 52 with respect to substrate 16 (Figure 3 and column 7, lines 1-5).

Regarding Claims 8,9: Gianchandani et al teach that voltage can be independently (selectively) applied to various second electrodes 51, 52 (like plurality of plasma generators). Gianchandani et al also teach that electrode segments (plurality of second electrodes) may be selectively moved around substrate area any of plurality of second electrodes 51, 52 and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35).

Regarding Claims 11,12: Gianchandani et al teach plurality of second electrodes are formed using lithography techniques (Figure 5, column 10, lines 15-25).

Regarding Claims 14,15: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Figure 1).

Regarding Claim 17: Gianchandani et al teach the apparatus is used for etching or deposition (column 2, lines 50-60).

Regarding Claims 18, 22, 23,37: Gianchandani et al teach that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr). It would be obvious to select

operating pressure as other process limitations like gases, material to be etched/deposited and voltages etc (column 8, lines 5-15).

Regarding Claims 20, 21: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35].

Claims 24-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870).

Regarding Claim 24: Gianchandani et al teach all limitations of the claim (as already explained above under claim 1) and further including formation of plurality of micro-plasmas 81, 82 (like plurality of plasma generating units) using edges of layers 22, 26, 71 that define an opening at substrate 17 surface and where micro-plasma is formed. Gianchandani et al further teach that micro-plasma 82 is also formed adjacent to openings 24 and 27 in the dielectric layer 22 and upper electrode 26 respectively (Figure 6 and column 10, line 30 to column 11, line 55).

Though Gianchandani et al do not explicitly teach plurality of plasma generating units comprising a first electrode and plurality of second electrodes, it would be obvious to duplicate the plasma generating units comprising first electrode (substrate 17) and electrode segments 51, 52 (second electrodes) to obtain faster speed of processing and improved through-put.

It would therefore be obvious to duplicate the plasma generating units as taught by Gianchandani et al to obtain faster processing speed and higher through-put.

Regarding Claim 25: Gianchandani et al teach that voltage can be independently (selectively) applied to various second electrodes 51, 52 (like plurality of plasma generators). Gianchandani et al also teach that electrode segments (plurality of second electrodes) may be selectively moved around substrate

area any of plurality of second electrodes 51, 52 and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35).

Regarding Claim 26: Gianchandani et al teach plurality of second electrodes are formed using lithography techniques (Figure 5, column 10, lines 15-25).

Regarding Claim 27: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Figure 1).

Regarding Claim 28: Gianchandani et al teach the apparatus is used for etching or deposition (column 2, lines 50-60).

Regarding Claim 29: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [column 2, line 40 to column 3, line 20 and column 6, line 60 to column 7, line 35].

Regarding Claim 30: Gianchandani et al teach that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr). It would be obvious to select operating pressure as other process limitations like gases, material to be etched/deposited and voltages etc (column 8, lines 5-15).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH

shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rakesh Dhingra

Parviz Hassanzadeh
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